Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of the Claims

Claims 1-7 (canceled).

Claim 8 (withdrawn) The method of claim 6, wherein the particle is magnetic and is moved to and from the surface in an uneven magnetic field.

Claim 9 (withdrawn) The method of claim 6, wherein the particle is charged and is moved to and from the surface by an electric field.

Claims 10-13 (canceled)

Claim 14 (withdrawn) An assembly for performing an electrophoretically-assisted assay, comprising:

an upper and a lower electrode chamber;

an electrode system disposed in the upper and lower electrode chamber,

a plurality of channels through which an electrical current passes; and

a plurality of semi-permeable membranes each having an activated surface,

wherein the semi-permeable membranes are positioned across the channels such that current passing through the plurality of channels, passes through the plurality of semi-permeable membranes, and wherein the semi-permeable membranes are penetrable for salt and buffer ions, but not for protein or polynucleotide analytes.

Claim 15 (withdrawn) The assembly of claim 14, further comprising a deflector disposed in the lower electrode chamber, wherein the deflector is effective for deflecting away from the bottom of the channels, gaseous electrochemical products that form in the lower electrode chamber.

Claim 16 (withdrawn) The assembly of claim 14, wherein an array of probe molecules is bound to each semi-permeable surface.

Claim 17 (withdrawn) A plate for an active assay, comprising a plurality of channels and a plurality of semi-permeable membranes having an activated surface with probes bound thereto, wherein each membrane of the plurality of semi-permeable membranes is positioned across a channel of the plurality of channels.

Claim 18 (withdrawn) The plate of claim 17, wherein a protein or polynucleotide probe is bound to the activated surfaces.

Claim 19 (withdrawn) The plate of claim 17, wherein an array of probes are bound to each activated surface of the plurality of semi-permeable membranes.

Claim 20 (withdrawn) The plate of claim 17, wherein the semi-permeable membrane is an activated cellulose membrane.

Claim 21 (new) A method for detecting analytes comprising:

a. immobilizing first probe molecules onto a surface of a first semi-permeable membrane, wherein only edges of the first semi-permeable membrane are bound to a first support;

b. placing a second semi-permeable membrane in a position that is parallel to the first semi-permeable membrane, forming a gap with the first semi-permeable membrane,

   i. wherein the first probe molecules are inside the gap and facing the second semi-permeable membrane; and

   ii. wherein only edges of the second semi-permeable membrane are bound to a second support;

c. contacting the side of the first semi-permeable membrane that is outside the gap with a first electrolyte solution, the first electrolyte solution being in contact with a first electrode;

d. contacting the side of the second semi-permeable membrane that is outside the gap with a second electrolyte solution, the second electrolyte solution being in contact with a second electrode;

e. filling the gap with an analyte solution or suspension to create a fluid connection between analytes in the analyte solution or the suspension with the first probe molecules;

f. applying an electric potential to the first electrode and the second electrode to electrophoretically move the analytes toward the first probe molecules;

g. removing the analytes that are unbound or weakly bound to the first probe molecules; and

h. detecting analytes bound to the first probe molecules.

Claim 22 (new) The method according to claim 21, further including introducing a suspension of particles immobilized with second probe molecules into the analyte solution or the suspension to detect the analytes bound to the first probe molecules.

Claim 23 (new) The method according to claim 22, wherein the particles are at least one of the following:

a. enzymes;

b. fluorescent particles;

c. magnetic particles;

d. nanoparticles;

e. radioactive isotopes;

f. dense particles; and

g. any combination of the above.

Claim 24 (new) The method according to claim 23, wherein the particles are the magnetic particles, further including applying a magnetic field to move the magnetic particles towards the first semi-permeable membrane, allowing the second probe molecules to bind with the analytes that are bound to the first probe molecules.

Claim 25 (new) The method according to claim 24, further including reversing the magnetic field to move unbound or weakly bound magnetic particles.

Claim 26 (new) The method according to claim 25, wherein the detecting is performed by detecting bound magnetic particles.

Claim 27 (new) The method according to claim 23, wherein the particles are the magnetic particles, further including applying an uneven localized magnetic field to direct the magnetic particles towards the first semi-permeable membrane, allowing the magnetic particles to stack over an area of the first semi-permeable membrane.

Claim 28 (new) The method according to claim 27, wherein the detecting is performed by moving the stack with the uneven localized magnetic field, allowing the second probe molecules to bind with the analytes that are bound to the first probe molecules.

Claim 29 (new) The method according to claim 23, further including applying an uneven magnetic field to direct the magnetic particles towards the first semi-permeable membrane, allowing the magnetic particles to contact the surface of the first semi-permeable membrane and be pushed over the surface by flow while remaining in contact with the surface.

Claim 30 (new) The method according to claim 29, wherein the detecting is performed by monitoring where the magnetic beads are arrested.

Claim 31 (new) The method according to claim 21, wherein the distance between the first electrode and the first semi-permeable membrane is at least 1 mm.

Claim 32 (new) The method according to claim 21, wherein the distance between the second electrode and the second semi-permeable membrane is at least 1 mm.

Claim 33 (new) The method according to claim 21, wherein the surface layer of the first semi-permeable membrane is an activated surface and is penetrable for salt and buffer ions, but not for analytes.

Claim 34 (new) The method according to claim 21, wherein the analyte solution is stabilized against convection due to membrane polarization, resulting in a self-forming density gradient.

Claim 35 (new) The method according to claim 21, wherein a multitude of the first semi-permeable membrane and a multitude of the second semi-permeable membrane are used in parallel to form a multitude of gaps.